FBI Approved Standards for Technical Testimony and Report Language for Explosives and Hazardous Devices Analysis

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1 PURPOSE

This document provides examples of the conclusions and opinions that are approved for reporting examination conclusions and offering expert opinion statements during testimony by examiners who conduct explosives and hazardous devices examinations in the FBI Laboratory. These examples are not intended to be all inclusive and may be dependent upon the precedent set by the judge or locality in which a testimony is provided. These examples are not intended to serve as precedent for other forensic laboratories and do not imply that statements by other forensic laboratories are incorrect, indefensible, or erroneous. The examiner may choose the appropriate wording used to express conclusions and opinions based on the nature of the evidence examined.

2 SCOPE

This document applies to examiners who prepare *Laboratory Reports* (7-1, 7-1 LIMS), and/or provide expert witness testimony in explosives and hazardous devices. This document does not apply to employees who provide fact witness testimony.

Laboratory Reports and/or expert witness testimony provided by explosives and hazardous devices examiners involve conclusions and opinions usually pertaining to the construction and functioning of improvised explosive devices (IEDs) and their associated components, however, the reporting and/or testimony may also pertain to other hazardous devices, such as, but not limited to, military explosive devices, commercial explosive devices, improvised incendiary devices (IIDs), and hoax devices, hereafter referred to collectively as devices. See the Explosives and Hazardous Devices Examinations Technical Procedure (TP) for a more detailed overview of the process used in the examination of these devices.

3 RESPONSIBILITIES

A. The examiner will ensure that a *Laboratory Report* complies with the statements contained within this document, when applicable.

B. The examiner will ensure that their testimony is consistent with the standards contained within this document, when applicable.

4 STATEMENTS APPROVED FOR FBI EXPLOSIVES AND HAZARDOUS DEVICES EXAMINATIONS TESTIMONY AND/OR LABORATORY REPORTS

4.1 Component Recognition

An examiner may report and/or state that a component of a device has been recognized if the examiner has assigned general attributes, or class characteristics, to that item. The characteristics of the components that predicate recognition must be recorded in the case notes.

Example: “Present within the evidence is a damaged, metallic fragment that is visually consistent with the skin of a nine-volt battery.”

Example: “Present within the evidence is a cylindrical object whose visual characteristics and measured, physical characteristics are consistent with those from the individual cells of a nine-volt battery.”

4.2 Component Identification

An examiner may report and/or state that a component of a device has been identified as a specific commercial product if the examiner has determined the *potential* commercial or manufacturing sources of the component from a forensic examination of the item. The characteristics of the components that predicate identification must be recorded in the case notes.

Example: “Present in the evidence is one nine-volt battery labeled ‘Raycell.’”

Example: “Present in the evidence is one nine-volt battery that bears markings consistent with those used on Raycell batteries.”

4.3 Confirmed Component Source

An examiner may report and/or state that the commercial or manufacturing source of a component has been definitively determined or confirmed if the source of the component has been corroborated through direct communications with the distributor or manufacturer. Such communications must be recorded in the case notes and Communication Log and stated in the *Laboratory Report*.

Example: “Consultation with sales representatives of Joe’s Electronics Shack determined that the switch present in the evidence was distributed by their store located at 1234 Hank Stuart Square, Dunlevy, VA 21100.”

Example: “Consultation with technical representatives from the Raycell Corporation determined that the nine-volt battery present in the evidence was manufactured by the Raycell Corporation on January 20, 1987, at their manufacturing plant in Swisher, TN.”

4.4 Company Identifications

An examiner may report and/or state the company that is assigned a particular trademark, barcode, Underwriters Laboratory (UL) listing code, etc., by reference to an appropriate, reliable source. The source of the information must be recorded in the case notes.

Example: “The trademark ‘HEAL-AID’ on the submitted item is visually consistent with the trademark assigned to the Kurt & Kuprik Company line of adhesive bandages.”

Example: “Printed on Item 1 were the letters ‘TKJ’ in a circle and ‘E91666.’ These markings are visually consistent with the markings used on electronic components by the Keidi Jaman Corporation located in Taiwan.”

4.5 Device Component Associations

An examiner may report and/or state that an association has been made between multiple device components based on their visual and/or physical properties and construction materials and characteristics. These comparisons are limited to the construction and class characteristics

of the components, and as such, are not individualizing. The characteristics that predicate associations must be recorded in the case notes.

Example: “The metal fragment present in the evidence is visually consistent with the skin of the batteries recovered from the search of the suspect’s residence.”

Example: “The metal fragment present in the evidence shares certain visual and physical characteristics with the skin of the batteries recovered from the search of the suspect’s residence. These characteristics are listed in Table 1. Figure 1 depicts the specimens that were compared.”

Example: “A comparison examination was made between the homemade switch present in the evidence and a homemade switch recovered from the suspect’s residence. These switches bear indistinguishable class characteristics. The switches are depicted in Figure 1 and their characteristics are summarized in Table 1.”

4.6 Inconclusive Component Recognition or Identification

An examiner may report and/or state that an inconclusive result has been reached if the determination has been made that that there is insufficient quality and/or quantity of corresponding information such that the examiner is unable to recognize or identify a component.

Example: “A conclusive determination as to the source of the metallic fragment present in the evidence could not be made.”

Example: “The metallic fragment present in the evidence could not be conclusively identified.”

4.7 Device and Device Component Exclusions

An examiner may report and/or state that an exclusion has been made if the determination that the construction/class characteristics of two or more devices or device components are not the same because there is sufficient quality and/or quantity of information in disagreement. The characteristics that predicate exclusions must be recorded in the case notes.

Example: “The metallic fragment present in Item 1 was not visually and physically consistent with the metallic fragments present in Item 25.”

Example: “The metal fragment present in the evidence does not share visual and physical characteristics with the skin of the batteries recovered from the search of the suspect’s residence.”

Example: “Forensic examinations performed on the IED recovered from the bank and the IED recovered from the suspect’s residence revealed dissimilar construction characteristics.”

4.8 Device Determination

An examiner may report and/or state that the components present in the evidence are those of a complete or partial device. If a partial device is present, the examiner must report and/or state what components are missing. An examiner may also report and/or state how the missing components can be procured and the availability of such components in the marketplace.

Example: “Present in the evidence are the fragmented components of an improvised explosive device (IED), also referred to as a homemade bomb. The components consist of… Properly assembled and initiated, this device would be capable of creating an explosion, thereby causing property damage, personal injury, or death.”

Example: “Present in the evidence are some of the fragmented components of an improvised explosive device (IED), also referred to as a homemade bomb. The components consist of…, however, a switch could not be conclusively identified. Various types of switches are widely available to the public in a variety of retail outlets and on the Internet. Properly assembled with an appropriate switch and initiated, this device would be capable of creating an explosion, thereby causing property damage, personal injury, or death.”

4.9 Destructive Device Determination

A destructive device is a device designed to serve as a weapon. As "designed" infers an element of intent, the jury is the final arbiter as to whether an intact device or device components constitute the legal definition of a destructive device.[1] An examiner may report and/or state that the device or device components present in the evidence are those of a destructive device if the examiner has determined from a physical examination of the evidence that the device or its components possess the functional characteristics and/or design elements of a weapon. In the absence of characteristic weapon design elements, the physical examination of a device or its components taken outside the context of utilization may not allow a destructive device determination to be made. In said absence, the examiner may consider how the device was used to determine its capability to function as a weapon.

Example: “A destructive device is a device that has the functional characteristics and/or design elements of a weapon. The design of the device incorporated an element that has been utilized by bomb builders to increase an IED’s potential to inflict personal injury or property damage. This element included nails taped to the outside of the cardboard tube. Due to this design element, it is the opinion of this examiner that the IED components present meet the two technical elements of a destructive device. Properly assembled and initiated, the resulting explosion of this destructive device could cause property damage, personal injury, or death. The two elements of a destructive device are purely technical, not legal, and are not meant to infer the intent of the individual(s) who constructed the device. A detailed description of the components that comprise this device is provided hereafter.”

Example: “A destructive device is a device that has the functional characteristics and/or design elements of a weapon. The IED present in the evidence is one improvised firework consisting of a pyrotechnic composition enclosed in a cardboard tube with clay end plugs and a length of pyrotechnic fuse inserted through an end plug into the pyrotechnic composition. Physical examination of the IED did not reveal functional characteristics and/or design elements of a weapon. However, in the proper circumstances the device could be applied in such a capacity; the resulting explosion could cause property damage, personal injury, or death. The two elements of a destructive device are purely technical, not legal, and are not meant to infer the intent of the individual(s) who constructed the device.”

[1] 26 U.S.C. § 5845(f) and 18 U.S.C. § 921(a)(4), 2013.

Example: “A destructive device is a device that has the functional characteristics and/or design elements of a weapon. The IED present in the evidence is one improvised firework consisting of a pyrotechnic composition enclosed in a cardboard tube with clay end plugs and a length of pyrotechnic fuse inserted through an end plug into the pyrotechnic composition. Physical examination of the IED did not reveal functional characteristics and/or design elements of a weapon. However, correspondence from your office stated that the IED was thrown into a bank, the resulting explosion causing property damage and personal injury. In the prescribed circumstances the IED was applied in the fashion of a weapon and would constitute a destructive device. The two elements of a destructive device are purely technical, not legal, and are not meant to infer the intent of the individual(s) who constructed the device.”

4.10 Device Function Determination

An examiner may report and/or state how the components present in the evidence could be logically combined to make a functioning device. An examiner may also report and/or state how a missing component of the device could be logically combined to manufacture a complete device, as well as the ease or difficulty involved in such a process.

Example: “The most logical functioning for this IED would be that of a victim-operated device. Mechanical pressure is applied to the switch, causing current from the battery to flow to the detonator, causing its explosion, and subsequently the explosion of the main charge.”

Example: “The most logical functioning for this IED would be that of a victim-operated device. A particular action of the victim when applied to a switch would cause current from the battery to flow to the detonator, causing its explosion, and subsequently the explosion of the main charge. A switch could not be conclusively identified in the evidence. Various types of switches are widely available to the public in retail outlets and on the Internet. The contacts of the switch would have to be connected to the red and green wires shown in Figure 1 for the IED to function properly. An individual familiar with the use of hand tools, in particular wire cutters and pliers, could attach the red and green wires to the contacts of an appropriate switch.”

4.11 Device Associations

An examiner may report and/or state that an association has been made between multiple devices based on their visual and/or physical properties and construction materials and characteristics. These comparisons are limited to the construction materials and characteristics of the devices, and as such, are not individualizing. The characteristics that predicate associations must be recorded in the case notes.

Example: “The IEDs examined in the evidence shared similar construction characteristics and could have been constructed by the same individual or by multiple individuals using similar instructions. These characteristics are listed in Table 1. Figures 1 - 10 depict the IEDs and specific components that were compared.”

Example: “The IEDs examined in the evidence shared indistinguishable construction characteristics and materials. These similarities indicated that the IEDs were most likely either constructed by the same individual or by multiple individuals using identical instructions, materials, and construction techniques.”

4.12 Production Processes

An examiner may report and/or state the production process used to manufacture an explosives-related item when the physical characteristics present on the item permit such an inference and the examiner understands the production process.

Example: “Due to the physical characteristics of the yarn windings, the detonating cord appeared to have been manufactured on a spinning-type machine.”

4.13 Damage and/or Injury from Explosives and Devices

An examiner may report and/or state that the explosion of an device or explosive could cause damage to the surroundings, personal injury, or death.

Example: “The explosion from an IED of this type could cause damage to surrounding objects, injury, or death to personnel in the vicinity.”

Example: “The explosion of the bulk explosive recovered from the suspect’s residence could cause property damage, personal injury, or death.”

4.14 General Observations of Explosive Damage

An examiner may report and/or state that the damage observed on evidence is consistent with the damage from a low or high explosive.[2] The damage characteristics must be recorded in the case notes.

Example: “The damage observed on the fragmented metal pieces was visually consistent with high-explosive damage.”

4.15 Obliterating Damage to Device Components Caused by an Explosion

If the examiner has determined that the explosion and/or fire resulting from the functioning of a device caused obliterating damage, such as severe fragmentation, charring, or alterations to the device components, the examiner may not report, state, or imply that a conclusive determination of the exact construction characteristics and functionality of the device were made. However, the examiner may report and/or state the most logical construction characteristics and functioning mechanism of the device if the forensic examinations permit such an inference.

Example: “Conclusive determinations regarding the exact construction and functioning characteristics of the IED could not be made due to the extent of the damage to its components caused by the explosion.”

Example: “The exact construction and functioning characteristics of the IED could not be determined due to the extent of the damage to its components caused by the explosion; however, the most logical functioning of the IED would be that of a victim-operated device.”

[2] A low explosive is an energetic material designed to rapidly burn or deflagrate. A high explosive is an energetic material designed to detonate.

4.16 Obliterating Damage to Device Components Caused by a Render Safe Procedure

If the examiner has determined that the explosion and/or fire resulting from a render safe procedure has caused obliterating damage, such as severe fragmentation, charring, or alterations to the device components, the examiner may not report, state, or imply that a conclusive determination of the exact construction characteristics and functionality of the device were made. However, the examiner may report and/or state the most logical construction characteristics and functioning mechanism of the device if the forensic examinations permit such an inference.

Example: "Conclusive determinations regarding the exact construction and functioning characteristics of the IED could not be made due to the extent of the damage caused to its components by the render safe procedure utilized by local bomb squad personnel."

Example: "The exact construction and functioning characteristics of the IED could not be determined because of the extent of the damage caused to its components by the explosion due to the render safe procedure used by the bomb technician on-site; however, the most logical functioning of the IED would be that of a victim-operated device."

4.17 Identification of Chemical Substances and Explosives

An examiner may report and/or state the identification of a particular chemical substance or explosive only if the examiner qualifies the statement by referencing that the analysis was performed by an explosives chemistry examiner. Typically, for purposes of testimony, the explosives chemistry examiner is called to testify before the explosives and hazardous devices examiner to provide this foundation.

Example: "Chemical analysis of Item 1 revealed the presence of Trinitrotoluene (TNT). For detailed information on the chemical analysis conducted, see the FBI Laboratory Report for Laboratory number 2015-00565-3, dated February 1, 2015, and authored by Joseph Johnson."

Example: "Explosives chemistry examinations performed by Joseph Johnson of the Explosives Unit and reported on February 1, 2015 under Laboratory number 2015-00565-3, revealed the presence of Trinitrotoluene (TNT) on Item 1."

5 Statements Not Approved for FBI Explosives and Hazardous Devices Examination Testimony and/or Laboratory Reports

5.1 Production Sources Based on Component Markings

An examiner may not report and/or state that a particular company was the definitive source of an item based solely on the markings present on it.

For example, the item may have been counterfeited; therefore, the presence of a trademark does not necessarily imply that the company using that trademark produced it. However, an examiner may report that markings on evidence are visually consistent with the markings used by a particular company by reference to an appropriate, reliable source. See Section 4.4. The source of the information must be recorded in the case notes.

5.2 Conclusive Identifications from Partial Markings on Components

An examiner may not report and/or state that a conclusive identification of an item was made when the examiner has determined that there exist critical absences or alterations of specific manufacturer or other unique markings on items of evidence. If required, the examiner could confirm the commercial or manufacturing source of the component through direct communications with the distributor or manufacturer. See section 4.3.

For example, in the absence of other identifying information, an examiner could not report and/or state that the presence of the markings "R c l " on a damaged battery indicate that it was conclusively identified as a "Raycell" battery. However, the examiner could report and/or state that the partial markings share common visual characteristics, or similarities, with the markings on "Raycell" batteries, if that is the case.

5.3 Exclusion of All Other Sources

An examiner may not report and/or state that an item originated from a commercial source to the exclusion of all other sources unless the component's distributor or commercial manufacturer has confirmed this. See section 4.3.

For example, clothespins are a widely produced item. An examiner may not report and/or state that a clothespin from a device must have originated from a box of clothespins found in the search of a suspect's residence, however, an examiner can report and/or state that the clothespins shared common visual and/or physical characteristics, or similarities, if that is the case.

For example, in the absence of representatives from the Raycell Corporation confirming that Raycell manufactured a battery present in the evidence, the following statement is not allowed:

Example: Present in the evidence was a damaged battery manufactured by the Raycell Corporation.

5.4 Analytical Methodologies for Chemical Substances and Explosives Identification

An examiner may not report and/or state the analytical methodologies used by explosives chemistry examiners to identify a particular chemical substance or explosive unless specifically directed to do so by the court. Under this direction, the examiner must make clear to the court that they are not a trained chemist, may not be able to properly identify or explain the analytical methodologies used, and that the chemical analysis was performed by an explosives chemistry examiner.

For example, the following statement is in general not allowed:

Example: "Trinitrotoluene (TNT) was identified on the item by gas chromatography/mass spectrometry."

However, this statement would be allowed under the court's direction:

Example: "Your Honor, I am not a trained chemist and cannot explain the analytical methodologies used to identify the explosive. The examination was performed by an explosives chemist in the Terrorist Explosive Device Analytical Center and his report identified Trinitrotoluene on the item by using gas chromatography/mass spectrometry."

5.5 Conclusive Determination of Explosive from Damage Observations Only

An examiner may not report and/or state a conclusive determination as to the exact chemical composition of an explosive based only on the observed damage to components or the environment. See Section 4.14. For example, the following statements are not allowed:

Example: "The damage observed on the fragmented metal pieces was caused by the explosion of the high-explosive Trinitrotoluene (TNT)."

Example: "The damage observed to the structural columns of the building was caused by the explosion of the plastic explosive Composition 4 (C-4)."

5.6 Conclusive Determination of Explosive Characteristics from Damage Observations Only

An examiner may not report and/or state a conclusive determination as to quantifiable explosive characteristics of an explosive based only on the observed damage to components or the environment. See Section 4.14. For example, the following statements are not allowed:

Example: "The damage observed on the fragmented metal pieces was caused by the explosion of an explosive with a density greater than 1.0 g/cm^3."

Example: "The damage observed to the structural columns of the building was caused by the explosion of an explosive with a detonation velocity greater that 4.0 km/s."

Example: "The damage observed to the transfer girder of the building was caused by the explosion of an explosive with a mass of exactly 1000 pounds".

5.7 Legal Destructive Device Determination

An examiner may not report and/or state that the components present in the evidence are those of a destructive device *as specifically defined in the legal statutes* since this determination is not one of forensic science and is within the purview of the jury. However, an examiner may assist the jury in understanding the technical elements of a destructive device as described in section 4.9. For example, the following statements are not allowed:

Example: "Present in the evidence are the components of a destructive device as defined in Title 18 of the United States Code at Section 921 (a) (4)."

Example: "Present in the evidence are the components of a destructive device as defined in Title 26 of the United States Code at Section 5845 (f)."

5.8 Weapon of Mass Destruction Determination

An examiner may not report and/or state that a device or the components thereof constitute a "weapon of mass destruction" (WMD) since this is not a term used in the field of explosives and hazardous device analysis.[3] If the court requests that the examiner opine on this matter, the examiner must make clear that the term WMD does not have a technical definition in their discipline and may provide clarification to the court as to the destructive potential of the device.

[3] The legal definition of a weapon of mass destruction can be found at 18 U.S.C. § 2332(a) (c), 2013.

For example, the following statement is in general not allowed:

Example: “Present in the evidence are the components of an improvised explosive device (IED), also referred to as a homemade bomb, or weapon of mass destruction (WMD).”

However, the statement below would be allowed under the court’s request:

Example: “Your Honor, the term ‘weapon of mass destruction,’ or ‘WMD,’ does not have a technical definition in our discipline and is not a term we use in our reports. Therefore, I cannot determine based on technical data if an item is a WMD; however, it is my opinion that the components of the IED that I analyzed, if properly assembled and initiated, would make an effective weapon and its explosion would be capable of producing great damage and loss of life.”

5.9 Calculations Pertaining to Evidence

An examiner may not report or testify to the results of calculations pertaining to evidence that is presented for the first time to the examiner in the courtroom. The examiner will respectfully decline to perform such calculations on the grounds that such work requires technical verification. However, the examiner may provide estimates that are based on prior analyses conducted.

Example: “Counselor, the calculation(s) that you are asking me to make with respect to the evidentiary items that I analyzed require technical verification by another qualified FBI explosives and hazardous devices examiner.”

Example: “Counselor, I can’t make the calculation(s) that you are asking me for with respect to the evidentiary items that I analyzed because the calculations require technical verification by another qualified FBI explosives and hazardous devices examiner, however, I can provide you an estimate based on my reported analyses.”

6 Laboratory Report Reviews

The content of an explosives and hazardous devices *Laboratory Report* will be reviewed per the Explosives Quality Assurance and Operations Manual and the Explosives and Hazardous Devices Report Writing Guidelines TP, ensuring compliance with the statements in this document.

7 Testimony Reviews

Testimonies will be reviewed in accordance with the FBI Laboratory Quality Assurance Manual. The review will ensure compliance with the statements in this document.

8 References

Explosives Quality Assurance and Operations Manual

Explosives and Hazardous Devices Examinations TP

Explosives and Hazardous Devices Report Writing Guidelines TP

FBI Laboratory Quality Assurance Manual

FBI Laboratory Operations Manual

9 REVISION HISTORY

Revision	Issued	Changes
05	09/15/2022	Updated to new document template and updates made throughout for clarity. Added paragraph to scope that describes the types of devices that may be reported on and/or testified to.